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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re of Appellant Migaku Takahashi Serial No.: 09/268,948 Filing Date: March 16, 1999 Title: IRON NITRIDE FILM HAVING A NITROGEN MARTENSITE OF PHASE WITH α (200) SURFACE	)	Art Group: 1745 Examiner: Cantelmo, Gregg

REPLY BRIEF

Mail Stop APPEAL BRIEF-PATENTS
HON. COMMISSIONER FOR PATENTS
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant hereby submits the instant Reply Brief in support of the Appeal Brief submitted to the Board of Patent Appeals and Interferences on July 16, 2003, and in response to the Examiner's Answer, dated August 15, 2003.

ARGUMENT

(1) With respect to Item No. 8, Appellant agrees with the Examiner that claim 10 is to depend upon claim 1, as per the Preliminary Amendment of Paper No. 2. A corrected set of claims has been provided in a new Appendix.

(2) With respect to Item No. 11 and Issue I, Appellant submits that Takahashi et al does not disclose or suggest the coexistence of the α′ and γ′ phases at temperatures other than 250°C. The only evidence provided by Takahashi et al for the coexistence of the α′ and γ′ phases is provided on page 3043 thereof. Specifically, Takahashi discloses the phase change of $Fe_{16}N_2$ films from α″ + α′ to α + γ′ (see column 1 and Fig. 3). As seen from Fig. 3b, Takahashi et al does not disclose or suggest the coexistence of the α′ phase and the γ′ phase except at temperatures near 250°C. In fact Fig. 3 (b) appears to teach away from the coexistence of the α′ and γ′ phases at temperatures below 250°C.

However, with respect to the present invention, as discussed at pages 9 and 10 of the specification and as shown in Fig. 4, a γ′ phase is not shown to develop until after a heat treatment that is to occur at 150°C (page 7 of the present specification). The disclosure offered by Takahashi et al teaches away from the development of a γ′ phase in the thin film at a temperature as low as 150°C. Furthermore, there is no indication in Takahashi et al, that such a γ′ phase would be able to coexist with an α′ phase in the thin film upon cooling to room temperature. Given the degree to which Takahashi et al teaches away from the coexistence of an α′ and γ′ phase, especially under the processing conditions set forth by

the present application, Appellant submits that there could be no reasonable expectation that forming the film under the process conditions set forth in Takahashi could inherently generate the same product as set forth in claim 1. Accordingly, Takahashi et al fails to teach or suggest the present invention as set forth in claim 1.

(3) In regard to Item No. 11 and specifically, Issue II, Appellant submits that Takahashi et al places different limitations on its processing conditions than Appellant does with respect to the processing conditions for forming the product of the present invention. As such, Appellant submits that Takahashi et al cannot be considered to inherently anticipate the claimed the invention as set forth in claim 1. Specifically, Appellant submits that the electron density of Takahashi et al (about 10^9 cm^{-3}) differs from a preferable range for electron density of upwards of 10^{10} cm^{-3} for the instant invention. Appellant does recognize, as noted by the Examiner, that the lower end of the preferable range for the present invention is an electron density of 10^9 cm^{-3}.

However, the salient point is that Takahashi et al does not recognize that an electron density that is about a power of 10 greater can be used to achieve the results obtained with respect to the present invention. That the present invention indicates that a much higher electron density can be used in producing the product of

the present invention is an indicator that the process parameters used in forming the iron nitride film in the present invention would not necessarily have to equate with those set forth for creating the iron nitride film in Takahashi et al. Thus, the present invention, as set forth in claim 1, is not inherently anticipated by Takahashi et al.

For all the foregoing reasons and those set forth in the Appeal Brief submitted July 16, 2003, Appellant submits that claim 1, and claims 10 and 12 depending therefrom, are now in condition for allowance and hereby respectfully request that the rejection thereof based upon Takahashi et al be withdrawn.

If the Examiner or Board has any questions or comments that would advance the prosecution of this case, the Examiner or Board is invited to call the undersigned at 260/485-6001.

Respectfully submitted,

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Encs: Appendix of Clean Claims
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, on: August 29, 2003.

Randall J. Knuth, Registration No. 34,644
Name of Registered Representative

Signature

August 29, 2003
Date

APPENDIX OF CLAIMS UNDER APPEAL

1. A magnetic thin film comprising:

an iron nitride thin film having a nitrogen martensite α' phase with α (002) surface formed on a substrate, said iron nitride thin film being produced on the substrate in a manner so as to permit diffraction rays from a γ' phase to be observed, said α' phase having diffraction rays observed from only said α (002) surface.

10. The magnetic thin film manufacturing method of claim 1 in which an electron voltage during the formation of the iron nitride thin film is within a range of 0.01 to 1 Ev, and an electron density is within a range of 1×10^{9} to 1×10^{10} cm^{-3}.

12. The magnetic thin film in accordance with Claim 1 wherein said iron nitride thin film is formed on an iron under layer on said substrate.